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TRICHIURUS LEPTURUS LINN. FROM LONG ISLAND.

In searching through my records covering a period of twenty years I discovered two records of the cutlass-fish from Orient waters. The first individual, 17 inches in total length, was taken from Long Island Sound, July 16, 1902. The second was from Gardiner's Bay, in ten feet of water, on August 27, 1909. This specimen was 19 inches in total length. Its occurrence appears to be that of a very rare straggler.

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ON THE GENERA *Orestias* and *Empetrichthys*.

The genus *Orestias*, consisting of a number of species, is as far as known, confined to lakes and the stagnant portions of the rivers of the uplands of Central Peru and North central Chile.¹ During the Irwin Expedition of Indiana University it was found as far north as Gollarisquisga. It was found to be abundant in some of the streams and lakes about Cerro de

¹Prof. E. W. Berry expressed the opinion to the writer that the first uplift in the region of the Andes was eroded to mature topography. The present great height of the Andes is the result of a later uplift. The region about Junin and to a less extent about Lake Titicaca shows the ancient topography lifted to a height of 12,000 feet and more. Toward this highland, the streams from the east and west have cut deep gorges. Thus the Rimac flows in a narrow deep valley from Ticlio to Callao on the west and the Tarma river has cut a similar gash from above Tarma to La Merced on the east.

Orestias seems to be confined to the ancient highlands and the immediate slopes.

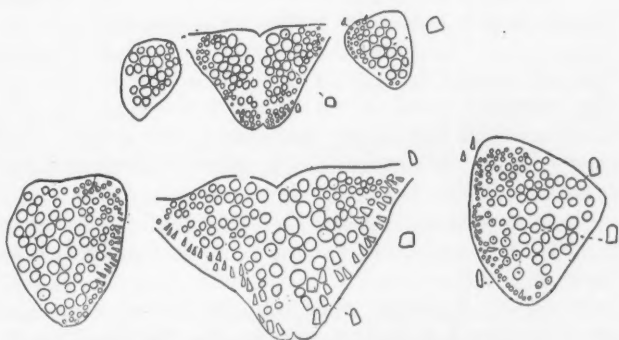
Pasco, Junin, Ticlio, Oroya, Jauja and Huancayo. Near Casapalca it occurs in some of the lakes of the Rimac basin on the Atlantic slope. Garman has previously recorded it from some of the lakes of this basin.

In the Urubamba system one small species was found just below Ollantaytambo at about 7000 feet. Below this elevation it was not seen. Different species are found in the lakes near Cuzco, Chinchero, Urcos and Langilaio, all of the Urubamba basin. Its point of greatest abundance both in individuals and in species is Lake Titicaca. Some of the species here attain a length of about a foot. Some of the larger are served in the restaurants as Pejerey and masses of some of the smaller species are sold in the markets dried together into cakes. It is found also in Lake Poopo into which Lake Titicaca drains and in the pools and creeks of the salinas south of Poopo along the railroad line inland from Antofagasta. I have an enormous number of specimens and hope sooner or later to determine the variation, modification with sex and age, etc., of the different species. Being found only in the highlands and reaching probably the highest altitude inhabited by fishes the question of the origin of this genus has always excited interest. *Orestias* is associated with various species of the genus *Pygidium*, in places with species of *Astroblepus*, even *Bryconamericus* and *Ancistrus*. All of these genera are mountain scalers, at home in the torrents from near sea-level to the heights. They may have worked their way up the present streams. Not so *Orestias*. It is not found in the torrential portions of the streams, but in backwater, lagoons, swamps, quiet places of the rivers and lakes, never, as far as known, below 7000 feet. It attains a height of about 16,000 feet and is at its best around 12,000 feet. No relatives are known to occur in the lowlands skirting its mountain homes. It is an ancient genus whose origin is bound up with the origin of the Andes. Its ancestors were pushed up by the rise of the Andes and

thus isolated from their relatives which are practically extinct in Peru.

Its distinguishing characters are the united lower pharyngeal bones and absence of ventral fins. The teeth on the pharyngeals differ from slender needles to rounded pavement. The shape of the pavement teeth is an adaptation to the nature of the food; only those species feeding on small mollusks have pavement teeth. The shape of the short blunt pavement teeth is not due to wear since relay teeth which have not pierced the gum have the same shape as those long in use. The teeth in the jaws are in single series, needle shaped or conic.

Empetrichthys, the genus most closely related to *Orestias*, consists of one species, *merriami*. It is found at Ashmeadows and Pahrump Valley, Nevada near the boundary between California and Nevada, at an elevation of about 3800 feet. (Ashmeadows). It also lacks ventrals and the lower pharyngeals are also united. The teeth of the jaws are in two series with a few teeth scattered between the series. They are triangular, compressed antero-posteriorly. The teeth on the pharyngeals are pavement teeth, very similar to those of the *jussei* group of the genus *Orestias*.



PHARYNGEAL TEETH OF *EMPETRICHTHYS* (above)
and *ORESTIAS* (below)

Are *Empetrichthys* and *Orestias* so widely separated in space the remnants of a group of the Poeciliidae formerly generally distributed in the mountains between the United States and Chile or are they products of the Independent but parallel evolution of *Fundulus*? They are so similar that they might readily be considered as forming but one genus. The double series of teeth in the jaws and the terminal though oblique mouth and the slightly more posterior position of the dorsal are the only characters distinguishing *Empetrichthys* from all of the species of *Orestias*.

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NOTES ON Lampropeltis elapsoides virginiana
BLANCHARD.

In Number 81 of Occasional Papers of the Museum of Zoology, University of Michigan, this form is described by Mr. Blanchard, the type and one other specimen being from Raleigh, N. C., and he remarks, "So few specimens of this form are known that no general description can be drawn up."

To aid in throwing more light on this and related forms, I give below my notes on a number of "red king snakes" taken in this locality, not guaranteeing that all or any belong to this particular subspecies. The numbers used in referring to these snakes are from a serial list in my possession, the gaps being occupied by specimens (from other states) not referred to in this paper.

All are from Raleigh, North Carolina, the type locality of *virginiana*, except No. 32 from Rutherfordton, N. C.

No. 7, April 26, 1901, loreals absent, first row of temporals 1-1, scale rows 19. In the other specimens the scale rows are 19, and the first row of temporals 1-1, unless otherwise stated.

No. 13, April 1899, loreals present, temporals 2-2, scales 21, the adjacent black rings unite on the ventrals thus enclosing the red dorsal saddles.

No. 19, May 10, 1905, loreals absent, no other data preserved.

No. 20, Oct. 1904, 180 mm., loreals present, scale rows 19, the white rings are interrupted on the belly by black, the red rings uninterrupted.

No. 21, October 1904, 150 mm. loreal present on one side, but reduced on the other to a small triangular plate at the junction of the prefrontal, nasal and first and second upper labials. Typical *elapsoides* in color.

No. 22, June 20, 1901, 450 mm., loreal absent on one side and represented on the other by a triangular plate cut off front of prefrontals and extending to the labials. Nearly typical *elapsoides*, but has black spots on the belly opposite the white rings. Temporals 2-1, scale rows 21.

No. 23, June 20, 1901, 240 mm., loreals absent, sixth upper labial on each side reaches to parietals and suppresses temporals. Red rings closed by a partially divided black tract on middle line of belly. Black spots on belly opposite white rings are present on hinder half of belly only.

No. 24, Feb. 28, 1906, 518 mm., loreal absent, no color notes.

No. 25, April 9, 1906, 534 mm., loreal present, no color notes.

No. 26, May 30, 1906, 225 mm., loreal present. Chin, throat and belly white, unmarked, the red rings extending about one scale width on ventrals, till about third ring in front of vent where they encroach more. Red rings in front of vent and all on tail extend all the way round. White rings all narrowed on the third and fourth rows of scales, so much so in the third, fourth and fifth rings from head that the black of adjoining rings unites, separating the white of the rings from the white of the belly, head red. This speci-

men superficially looks much like a *Cemophora coccinea*.

No. 27, June 16, 1906, 450 mm. Loreals present. White rings all complete, not interrupted on belly, the white extending along the center of the belly completely interrupting all the red and black rings, except the posterior one of the second pair of black rings which extends across the belly. Inferior edges of each red saddle bordered with a more or less complete row of small black spots. Red spots extending about width of two scale rows on ventrals. Red rings on tail complete and the three preceding the vent also nearly complete across the belly.

No. 28, July, 1907. 175 mm., loreal present. Belly white with black spots opposite the white cross bars. Red spots not closed by black below, except the one just back of head.

No. 29, Oct. 1909, 185 mm., loreal present. No color notes.

No. 31, June 5, 1914, 540 mm. Loreals absent. Six red rings in front of vent practically complete, those anterior to this more or less divided by white below, rings interrupted by black spotting on middle of belly, especially posteriorly.

No. 32, Rutherfordton, N. C., January 2, 1911, 450 mm., loreals absent. Black rings complete, mostly more or less black markings on belly opposite red and white rings, these much heavier posteriorly and wholly or mainly lacking near head.

No. 33, July 24, 1917, 354 mm., loreals present. Nearly typically *elapsoides* in color and markings. White rings with no black on belly.

No. 34, August 18, 1917, 360 mm., loreals present. Nearly typically *elapsoides* in color and markings, but white rings, except anterior five containing black spots on the belly, red rings mostly interrupted on belly by narrow bars of whitish.

It will be seen that of the seventeen specimens listed, three (Nos. 13, 23, 32) refer to *virginiana* on

color pattern; seven (Nos. 20, 21, 22, 28, 31, 33, 34) to *clapsoides*; one, No. 27, would appear to be intermediate; one, No. 26, is abnormal in its ventral coloration, while the remaining five have no color notes preserved.

C. S. BRIMLEY,
Raleigh, N. C.



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